WE CLAIMED:

1. A method of aligning a diffractive wavelength division multiplexing (WDM) device that includes i) a multi-channel, light handling device having a selected channel spacing and ii) a multi-channel signal input unit, the method comprising:

adjusting a direction of incidence of an optical signal from the input unit on at least a first diffracting element of the WDM device so as to set an actual optical channel spacing at an output region of the WDM device to be approximately equal to the selected channel spacing of the multi-channel, light handling device.

2. A method as recited in claim 1, wherein adjusting the direction of incidence of the optical signal includes orienting the input unit includes rotating the input unit about a rotation axis of an input unit collimating lens, the rotation axis being perpendicular to a direction of light propagation through the collimating lens.

3. A method as recited in claim 1, wherein adjusting the direction of incidence of the optical signal orienting the input unit includes rotating the input unit about an exit face of a multichannel input fiber coupled to an input of the input unit.

4. A method as recited in claim 1, wherein the input unit has a longitudinal axis and adjusting the direction of incidence of the optical signal unit includes rotating the collimator unit about a point on the longitudinal axis of the collimator unit.

5. A method as recited in claim 1, further comprising translating the multichannel, light handling device in a direction parallel to a diffraction plane of the diffractive WDM device.

6. A method as recited in claim 1, further comprising translating the multichannel, light handling device in a direction perpendicular to a diffraction plane of the diffractive WDM device.

7. A method as recited in claim 1, further comprising translating the input unit in a direction parallel to a diffraction plane of the diffractive WDM device.

8. A method as recited in claim 1, further comprising translating the input unit in a direction perpendicular to a diffraction plane of the diffractive WDM device.

9. A method as recited in claim 1, further comprising aligning a first channel signal to a first output channel of the multi-channel, light handling device, measuring a distance between an Nth channel signal and an Nth channel of the multi-channel, light handling device, and orienting the input unit to align the Nth channel signal to the Nth channel of the multi-channel, light handling device.

10. A method as recited in claim 1, further comprising diffracting the optical signal from the input unit using at least one transmissive diffracting element so as to separate optical channels at the output region of the WDM device.

11. A method as recited in claim 1, further comprising

i) aligning a first channel signal to a first channel of the multi-channel, light handling device,

ii) measuring a separation between an Nth channel signal and a corresponding Nth channel of the multi-channel, light handling device,

iii) orienting the input unit to align the Nth channel signal to the Nth channel of the multi-channel, light handling device,

iv) checking that the first channel signal is aligned to the first channel of the multi-channel, light handling device, and

v) repeating steps i) to iv) if the first channel signal is not aligned to the first channel output of the multi-channel, light handling device.

12. A diffractive WDM device, comprising;

inputting means for inputting light to the diffractive WDM device;

at least a first light diffracting means for diffracting light received from the inputting means;

multi-channel light handling means for handling a multi-channel signal received from the at least a first light diffracting means, the multi-channel light handling means having a selected channel spacing; and

adjusting means for adjusting a direction of incidence of an optical signal from the inputting means on the at least a first diffracting means so as to set an actual optical channel spacing at an output region of the diffractive WDM device to be approximately equal to the selected channel spacing of the multi-channel, light handling means.

13. A device as recited in claim 12, wherein the adjusting means includes means for adjusting orientation of the input means in a direction parallel to a diffraction plane of the diffractive WDM device.

14. A device as recited in claim 12, further comprising first translating means for translating one of the inputting means and the multi-channel light

handling means relative to the other of the inputting means and the multi-channel light handling means in a direction parallel to a diffraction plane of the diffractive WDM device.

15. A diffractive WDM device as recited in claim 12, further comprising second translating means for translating one of the inputting means and the multi-channel light handling means relative to the other of the inputting means and the multi-channel light handling means in a direction perpendicular to a diffraction plane of the diffractive WDM device.

16. A diffractive WDM device, comprising;

a light input unit for inputting a multi-channel optical signal;

at least one diffracting element;

a multi-channel, light handling device disposed to receive light from the at least one diffracting element, the multi-channel light handling device having a selected channel spacing; and

at least one focusing element to focus light from the at least one diffracting element to the multi-channel, light handling device;

wherein an orientation of the light input unit is adjustable in a direction parallel to a diffraction plane of the diffractive WDM device so as to select an actual channel spacing at the multi-channel, light handling device that is approximately equal to the selected channel spacing.

17. A diffractive WDM device as recited in claim 16, wherein the light input unit includes a fiber for coupling light into the diffractive WDM device.

18. A diffractive WDM device as recited in claim 17, wherein the light input unit further includes one or more lenses for collimating light exiting from an output end of the fiber.

19. A diffractive WDM device as recited in claim 18, wherein at least one of the lenses is a spherical lens.

20. A diffractive WDM device as recited in claim 18, wherein at least one of the lenses is a cylindrical lens.

21. A diffractive WDM device as recited in claim 18, wherein the light input unit includes a first lens disposed to reduce divergence of light exiting from the fiber, a polarization splitter disposed to split polarization of light received from the first lens into first and second beams having orthogonal polarization states and a polarization rotator disposed to rotate polarization of the first beam so as to be approximately parallel to polarization of the second beam.

22. A diffractive WDM device as recited in claim 21, further comprising at least one collimating lens to collimate the first and second beams.

23. A diffractive WDM device as recited in claim 21, further comprising at a first cylindrical collimating lens to collimate the first and second beams in a first direction and a second cylindrical lens to collimate the first and second beams in a second direction.

24. A diffractive WDM device as recited in claim 16, wherein the at least one diffracting element includes a transmissive diffracting element.

25. A diffractive WDM device as recited in claim 16, wherein the at least one diffracting element includes two or more diffracting elements in series between the input unit and the at least one focusing element.

26. A diffractive WDM device as recited in claim 16, wherein the at least one focusing element includes a reflecting focusing element to focus separated optical channels from the at least one diffracting element to the multi-channel, light handling device.

27. A diffractive WDM device as recited in claim 26, wherein the reflecting focusing element is aspheric.

28. A diffractive WDM device as recited in claim 26, further comprising a cylindrical lens disposed between the reflecting focusing element and the multi-channel, light handling device for focusing light in a direction perpendicular to a diffraction plane of the diffractive WDM device.

29. A diffractive WDM device as recited in claim 26, wherein the at least one focusing element further includes a lens array disposed between the reflecting focusing element and the multi-channel, light handling device to focus individual optical channels to respective channel segments of the light handling device.

30. A diffractive WDM device as recited in claim 16, wherein the multi-channel, light handling device includes a fiber array.

31. A diffractive WDM device as recited in claim 16, wherein the multi-channel, light handling device includes a detector array.

32. A diffractive WDM device as recited in claim 16, wherein the multi-channel, light handling device includes an optical switch array.

33. A diffractive WDM device as recited in claim 16, wherein the multi-channel, light handling device includes a multi-channel gain flattening filter device.

34. A diffractive WDM device as recited in claim 16, further comprising a screw adjustment for adjusting an orientation of the light input unit.